

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY
OR PRIVILEGE ARE CLAIMED ARE AS FOLLOWS:

Suk A

1. A hydrogen generating system for use in an internal combustion engine for increasing the efficiency of the engine and decreasing emissions from the engine, the hydrogen generating system comprising:
an electrolysis cell for generating hydrogen and oxygen gases by electrolysis of an aqueous solution,
a power source for providing electrical power to the electrolysis cell;
an outlet flow means for introducing the generated gases into the intake manifold system of an internal combustion engine;
a monitoring means for monitoring the operating conditions of the hydrogen generating system, the monitoring means including an electrolyte level monitoring device in the electrolysis cell including a tube, a circuit disposed in the tube, the circuit including a switch positioned adjacent a selected level of the aqueous solution and a float selected to float on the aqueous solution, the float being slidably engaged on the tube, and free to ride along the tube as driven by changes in the surface level of the aqueous solution and the float including means for actuating the switch as it rides along the tube; and
a control means in communication with the monitoring means and adapted to control the operation of the hydrogen generating system in response to the monitoring means, the

control means including means in communication with the electrolyte level monitoring device and adapted to indicate when the level of the aqueous solution reaches the selected level as indicated by the float actuating the switch.

2. A hydrogen generating system for use in an internal combustion engine for increasing the efficiency of the engine and decreasing emissions from the engine, the hydrogen generating system comprising:

an electrolysis cell for generating hydrogen and oxygen gases by electrolysis of an aqueous solution contained within the cell, the electrolysis cell having an outer surface;

a power source for providing electrical power to the electrolysis cell;

an outlet flow means for introducing the generated gases into the intake manifold system of an internal combustion engine;

a monitoring means for monitoring the operating conditions of the hydrogen generating system, the monitoring means including an electrolyte level monitoring device including a tank circuit having an inductor and a capacitor connected in parallel, the inductor being an electrical wire wrapped at least one turn about the electrolysis cell adjacent a selected level of the aqueous solution within the electrolysis cell, and interface circuitry for exciting the tank circuit such that a sine wave is generated and observing evidence of energy loss in the circuit; and

a control means in communication with the monitoring means and adapted to control the operation of the hydrogen generating system in response to the monitoring means, the control means including means in communication with the electrolyte level monitoring device and adapted to indicate when the level of the aqueous solution reaches the selected level as indicated by the energy loss in the circuit.

3. A hydrogen generating system for use in an internal combustion engine of a vehicle for increasing the efficiency of the engine and decreasing emissions from the engine, the hydrogen generating system comprising:

an electrolysis cell for generating hydrogen and oxygen gases by electrolysis of an aqueous solution;

a power source for providing electrical power to the electrolysis cell as supplied by a battery power supply;

an outlet flow means for introducing the generated gases into the intake manifold system of the internal combustion engine;

a monitoring means for monitoring the operating conditions of the hydrogen generating system, the monitoring means including a sensor for monitoring battery voltage; and

a control means in communication with the monitoring means and adapted to control the operation of the hydrogen generating system in response to the monitoring means, the control means including means for comparing the battery voltage to a voltage indicative of proper alternator operation and controlling operation of the hydrogen

generating system when the battery voltage is not indicative of proper alternator operation.

4. The hydrogen generating system of claim 3 wherein the control means is further adapted to indicate that the battery voltage is not indicative of proper alternator operation.

5. A hydrogen generating system for use in an internal combustion engine of a vehicle for increasing the efficiency of the engine and decreasing emissions from the engine, the hydrogen generating system comprising:

at least one electrolysis cell for generating hydrogen and oxygen gases by electrolysis of an aqueous solution;

a power source for providing electrical power to the electrolysis cell;

an outlet flow means for introducing the generated gases into the intake manifold system of an internal combustion engine, the outlet flow means including a vacuum pump for drawing the generated gases under vacuum toward the internal combustion engine, the vacuum pump having an inlet tubing and an outlet tubing and a vacuum control arrangement for conveying supplemental gas from gas source and introducing the substantial gases to the generated gases in the inlet tubing to reduce the vacuum generated by the vacuum pump;

a monitoring means for monitoring the operating conditions of the hydrogen generating system; and

a control means in communication with the monitoring means and adapted to control the operation of the hydrogen generating system in response to the monitoring means.

6. The hydrogen generating system of claim 5 wherein the gas source is atmospheric air.

7. The hydrogen generating system of claim 5 wherein supplemental gas is heated over ambient air temperature, filtered and/or dried.

8. The hydrogen generating system of claim 5 wherein the gas source is the exhaust gas manifold of the vehicle.

9. The hydrogen generating system of claim 5 wherein the gas source is the air intake of the vehicle downstream of the mass air flow sensor.

10. The hydrogen generating system of claim 5 wherein the vacuum control arrangement includes a valve for controlling the flow of supplemental gas into the inlet tubing.

11. The hydrogen generating system of claim 5 wherein the supplemental gas is introduced to the inlet tubing between a flame arrestor and the vacuum pump.

12. A hydrogen generating system for use in an internal combustion engine of a vehicle for increasing the efficiency of the engine and decreasing emissions from the engine, the hydrogen generating system comprising:

a plurality of modules, each module containing an electrolysis cell for generating hydrogen and oxygen gases

by electrolysis of an aqueous solution; a power regulator for providing regulated electrical power to the electrolysis cell, the power regulator generating an AC component; an outlet flow means for introducing the generated gases from the cells into the intake manifold system of the internal combustion engine;

a monitoring means for monitoring the operating conditions of the hydrogen generating system;

a control means in communication with the monitoring means and adapted to control the operation of the hydrogen generating system in response to the monitoring means; and

wherein the AC component of the power regulators are phase locked with a selected module acting as the master module and a selected others of the modules acting as slave modules.

wherein each module contains phase locking circuitry, the phase locking circuitry of the master module generating a chopping frequency and inputting the chopping frequency to the slave modules.

further comprising a controller selected to prevent the operation of any slave modules not phase locked with the master module.

13. The hydrogen generating system of claim 12 wherein the controller is a subroutine in the control means.

14. A hydrogen generating system for use in an internal combustion engine of a vehicle for increasing the efficiency

of the engine and decreasing emissions from the engine, the hydrogen generating system comprising:

an plurality of electrolysis cells for generating hydrogen and oxygen gases by electrolysis of an aqueous solution, the electrolysis cells being electrically connected in series;

a power source for providing electrical power to the electrolysis cells through an output circuit;

an outlet flow means for introducing the generated gases into the intake manifold system of the internal combustion engine;

a monitoring means for monitoring the operating conditions of the hydrogen generating system, the monitoring means including sensor for monitoring the integrity of the output circuit from the power source; and

a control means in communication with the monitoring means and adapted to control the operation of the hydrogen generating system in response to the monitoring means, the control means including means in communication with the sensor for controlling operation of the hydrogen generating system based on the integrity of the output circuit.

15. The hydrogen generating system of claim 14 wherein the plurality of electrolysis cells includes a penultimate and last cells in the series and the sensor monitors the voltage in the electrical connection between the penultimate and last cells.

16. The hydrogen generating system of claim 14 wherein the sensor monitors current in the output circuit.